

the explorers to attribute the find to the earliest cave period. The position of the human remains, however, above the relic beds would, as Mr. Boyd Dawkins has shown in his work on "Cave-Hunting," be sufficient to throw doubt on their contemporaneity with the other relics of the cave were it not that skeletons have been since found in other caverns in the valley, and more particularly in that of Laugerie Basse, in positions which make it certain that they are of the age of the works of art found with them, and these skeletons correspond in their osteological peculiarities with those of Cro-Magnon. In both places the skulls are dolichocephalic, and both afford instances of men of large stature having platycnemid tibias, one of those from Cro-Magnon being, according to Boyd Dawkins, the extremest case of platycnemism on record. We have therefore good grounds for believing that markedly different types of mankind existed in the south of Europe during the reindeer period. This result has been held by polygenists to afford satisfactory confirmation of their views, but we may be permitted to doubt the validity of such conclusions. If, as has been suggested by Prof. Huxley, this part of Europe was occupied in the earliest times by a race of Melanochroi, consisting of a mixture of the dark long-headed race of the south with the fair and presumably short-headed race of the north, it is evident that types as divergent as any that are to be found at the present time must have existed amongst the earliest known inhabitants of this region. A long previous period of geographical separation under different climatic conditions would be sufficient to give permanence to varieties as distinct as any that have been brought to light by the researches of Anthropologists. We are far from believing that the reindeer period has carried us more than a short way towards the origin of the human race.

Since the explorations of Messrs. Lartet and Christy were brought to a close, another chapter has been added to the history of the reindeer period by the discovery of Mr. Conrad Merk in the cave of Kesslerloch, near Thayngen, in Switzerland; the value of this discovery is greatly enhanced by its vicinity to the relics of the later inhabitants of the lakes. Had the lake habitations been occupied at the same time as the cave, evidence of connection must undoubtedly have been found, but the contents of the cave point undeniably to a period contemporaneous with the remoter Troglydites of the Dordogne. Amongst the fauna the presence of the mammoth, rhinoceros, cave-bear, lion, and reindeer are alone sufficient to warrant this conclusion, whilst at the same time the works of art show a most remarkable resemblance to those of the French caves, and an equally marked contrast to those of the oldest of the Swiss lake villages. The carved harpoon heads of bone, the absence of pottery, the presence of deer-horns perforated with large holes bored from both sides, the use of which is unknown, and above all the engravings of animals, especially the reindeer, upon the horns of those animals, show that a condition of culture corresponding to that of the Dordogne people must have existed here.

Opinions differ as to which of the two localities have produced the highest types of art; the difference of style observable in the engravings is such as might be expected to exist amongst remote tribes, but the resemblance, when

compared with the productions of other races of savages is no less remarkable.

One of the engravings, attributed to the cave at Kesslerloch, calls for a few remarks. Of the genuineness of the relics discovered in this cave, no doubt has been entertained, with the exception of two. One of these, said to have been found by a workman in a heap of rubbish after the excavations had been completed, and under circumstances which gave rise to suspicion, represents a fox drawn front view, with the hind quarters fore-shortened. The specimen has been placed in the Christy collection in Victoria Street, not as a genuine relic of the cave, but for convenience of future reference. It is worthy of observation that in all the genuine engravings from the caves of both places the animals are invariably drawn with a side view, and generally following each other in the same direction, much as a child might have drawn them, and the same peculiarity is often to be noticed in the bone engravings of the Esquimaux. The forger of Kesslerloch was no doubt not aware of this, or a feebler exercise of his artistic talent would have served him in better stead. He has, however, done good service by drawing attention to the fact that the fore-shortening of a figure represents a phase of art at which the men of the reindeer period had not arrived. Surprise has been expressed by many at the truth and freedom of some of these designs, appertaining to so remote a period of man's history; but when we consider how early the power of drawing animals is shown by many of our own children, and how much pleasure they take in exercising it, we need not wonder that a great development of the faculty of imitation should be found to exist side by side with the proofs of a low condition of culture. Upon the whole we see nothing in these or any of the prehistoric discoveries of our time to weaken our faith in a slow but continuous progression from lower to higher forms of art and industry.

THE BOTHKAMP SUN OBSERVATIONS

Beobachtungen angestellt auf der Sternwarte des Kammerherrn von Bülow. Heft III. Edited by Dr. O. Lohse.

WHOEVER knows the good work that has been done at the Solar Observatory at Bothkamp will hear with regret that the observatory has ceased to exist. It seems that the work was discontinued as soon as Dr. Vogel left it to take his place in the new observatory of Berlin. The history of M. von Bülow's observatory is a fresh proof that work which requires long and continued observations cannot be made dependent on the generosity of a single man, but must be carried on by the State; yet everybody will join in Dr. Lohse's hope that the proprietor of the observatory, to whose liberality we are indebted for the observations made during many years, by Dr. Vogel and Dr. Lohse, and for their publication, will decide to continue his generous and useful work at a future time.

In two previous parts Dr. Vogel has given us the results of his observations, and we are promised a fourth part containing some further researches of his. The third part, which has just appeared, contains the work done by Dr. Lohse.

The paper consists in great part of tables containing

his observations. The list of sun-spots at the end of the publication and the various extracts from the note-book will prove very useful to those who are engaged in researches of a similar kind. The observations seem to have been conducted with great care, and Dr. Lohse gives us in every case the exact method by which the measurements have been made.

If we endeavour to review a work which is not being continued, at least for the present, we rather turn to the actual results of the observations than to a mere list of accumulated facts. This list, no doubt, may prove hereafter to be the most important part of the work, yet it is only made important by those who discuss the observations. The more doubtful and hypothetical part, containing the conclusions, is therefore the better test for the moment, for we must not forget that without a guiding idea a mere tabular arrangement of facts is useless.

One of the most curious results of Dr. Lohse seems to be the discovery of a period of fifty days in the eruptive activity of the sun. Dr. Lohse took from the drawings of protuberances published by the Spectroscopic Society of Italy, the area of the protuberances as shown in the drawings for each day, and made a curve in which the times of observation formed the abscissæ and the area of the protuberances the ordinates. This curve first shows maxima and minima corresponding to maxima and minima of sun-spots. It next shows a short period of fifty days. During the years 1871, 1872, and the beginning of 1873, this period was well marked. From the middle of 1873, however, the whole solar activity became so small, owing to its chief periodicity of eleven years, that these secondary maxima cannot any more be distinguished.

We turn now to the spectroscopic observations, in which Dr. Lohse was led to somewhat similar conclusions as Mr. Lockyer. It is a well-known fact, that while nearly all the elements standing at the positive end of the electro-static series are found in the sun, we have as yet obtained no decided evidence of the more electro-negative elements. On the other hand, it is not probable that the sun should not contain so many bodies which play an important part in our world. Both Mr. Lockyer and Dr. Lohse came to the conclusion that we must look in the outer and cooler layers of the sun's atmosphere for evidence of the metalloids, but while Mr. Lockyer assumes that they exist as well in the hotter parts of the solar envelope, but under such conditions that we cannot identify their spectra, Dr. Lohse assumes that they do not exist except in the outer layers of the corona. Dr. Lohse is thus forced to assume a force in the sun which drives all the more electro-negative elements away from its centre. This is an hypothesis which we cannot accept, unless we have independent evidence in its favour, or unless it is the only one which will account for the facts; just as we could not accept Mr. Lockyer's hypothesis, if we had no evidence of changes in spectra produced by variations of temperature and pressure. Mr. Lockyer's hypothesis has a decided advantage over that of Dr. Lohse, for we have recently obtained such strong proofs of the changes of spectra produced by a variation of temperature and pressure, that we cannot help thinking that, had Dr. Lohse been acquainted with all these recent experiments, he would have come to the same conclusion

as Mr. Lockyer. This conclusion, indeed, seems inevitable, if it is once assumed that the metalloids really exist in the sun. It is important to mention that this presence of metalloids in the sun is rendered still more probable by the fact that the red and most likely cooler stars give spectra containing fluted bands.

It is interesting to notice that Dr. Lohse finds many of the unknown dark lines contained in the blue end of the solar spectrum to be reproduced in the spectrum of α Herculis, and although weaker in that of α Orionis, while they are absent in that of α Bootis.

Dr. Lohse does not seem to arrive at any results differing much from those of other observers in his observations on faculæ and sun-spots. It is a matter of regret that he, most likely for the sake of brevity, does not enter more fully into the explanation of his own views. A discussion of ideas described in such a cursory manner is impossible, as such a description is necessarily incomplete.

We hope that Dr. Lohse will have occasion to follow out his researches, and do not doubt that he will be rewarded by most interesting results.

ARTHUR SCHUSTER

OUR BOOK SHELF

The Absorptive Glands of Carnivorous Plants. By Alfred W. Bennett, M.A., B.Sc., F.L.S., Lecturer on Botany at St. Thomas's Hospital. Read before the Royal Microscopical Society, Dec. 1, 1875. With one plate.

MR. BENNETT notices the occurrence in *Drosera rotundifolia*, *Pinguicula vulgaris*, and *Callitriche verna* of peculiar bodies, which at first sight might be mistaken for stomata, and consisting of two nearly hemispherical cells filled with protoplasm. Each of the hemispheres contain a darker nucleus-like spot, and each is surrounded by a thin-walled cell containing chlorophyll. From these hemispherical bodies are developed the papillæ with thin walls and containing chlorophyll. *Drosera* and *Pinguicula* are carnivorous, and Mr. Bennett suggests that *Callitriche* may also be carnivorous, from the occurrence of these peculiar bodies. It seems probable that they are really as Mr. Bennett thinks, absorptive glands, and they certainly bear a strong superficial resemblance to the quadrifid processes found and described by Darwin in *Utricularia* and *Genlisea*. The subject is a very interesting one, and it is to be hoped that further research will throw more light on the matter. It is rather difficult to get a clear idea of the structures from the plate, which seems a little out of drawing, and rather confusing.

W. R. McNAB

Reseña de las Rocas de la Isla Volcánica Gran Canaria. Por Don Salvador Calderon. (Reprinted from the Anales de la Sociedad Española de Historia Natural. Tomo iv.) Madrid 1876.

IN this work, which is appropriately dedicated to M. Berthelot—to whom we owe one of the earliest descriptions of the geology of these interesting islands—the author gives some valuable information concerning the relations of the different classes of volcanic rocks to one another. He also describes some of the vast "Calderas" or craters so characteristic of this group of islands, and notices the theories which have been proposed to account for their origin. Of especial interest, however, is the account which he furnishes of the nature and composition of the different varieties of volcanic rocks, and the classification which he proposes for them. It would appear from this work of Señor Calderon, that the true or "sanidine-